EXTRACELLULAR MATRIX IN VETERINARY REGENERATIVE MEDICINE

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INTRODUCTION

The connective tissue is the morphologic support of the tissues , it is composed by cells and a extracellular matrix (ECM).

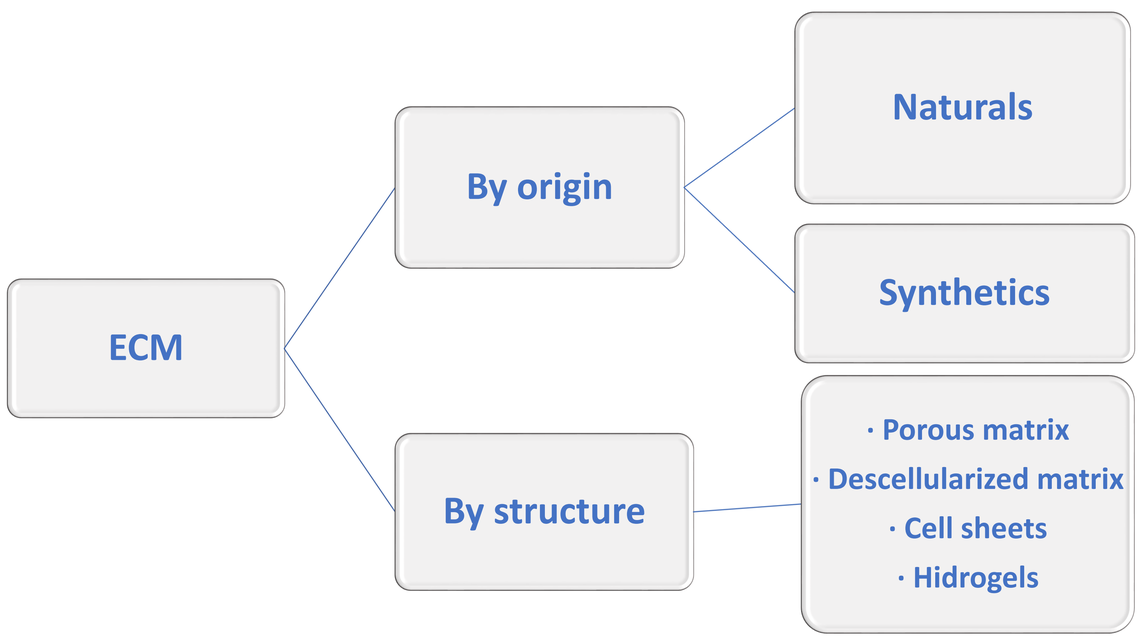
The ECM is a complex structure formed by fibers and an amorphous fundamental substance. In addition, the ECM allows cells to migrate, to proliferate and to achieve the terminal differentiation.

Regenerative medicine develop techniques to replace, to remodel and to regenerate both tissues and organs.

OBJECTIVES

• To conduct a bibliographic revision to define what a extracellular matrix is, how many types does exist and how has its application been developed over the years in regenerative medicine.
• To revise some animal models useful in human medicine and mainly, skin models developed in veterinary medicine.

TYPES OF EXTRACELLULAR MATRIX



ANIMAL MODELS FOR HUMAN REGENERATIVE MEDICINE

- Esophageal reconstruction
- Tracheal regeneration
- Stem cells to ischemic myocardium
- Regenerate tissue re-innervation

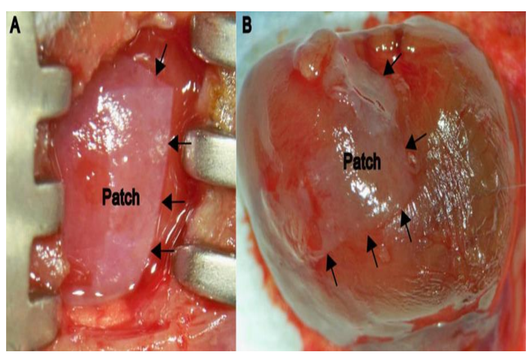


Figure 1. Patches of ECM on ischemic myocardium . (Wang et al. 2010)

Figure 2. Descellularized ECM to regenerate esophagus. (Badylak et al. 2005)

MODELS IN REGENERATIVE VETERINARY MEDICINE

One of the most frequent problems in vet medicine is the limited availability of large amounts of skin when extense wounds are present.

SKIN EQUIVALENTS IN DOG

- Skin equivalent using keratinocites from a 8mm skin biopsy seeded on a fibroblasts ECM (Serra et al. 2007)
- Epidermal equivalent using porcine acellular dermis like an ECM scaffold. (Cerrato et al. 2012)

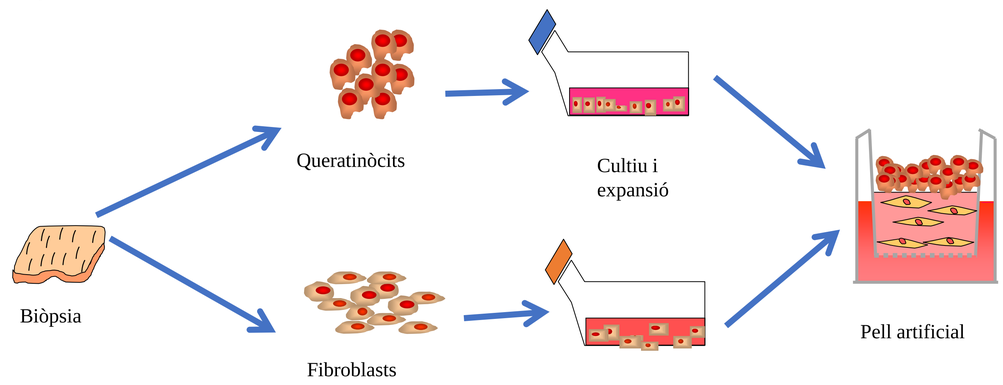


Figure 3. Development of an skin equivalent

AUTOLOGOUS SKIN

- A complete autologous skin isolating keratinocites and fibroblasts from a biopsy and seeding them in a coagulated plasma ECM was developed (Ramió-Lluch et al. 2017)

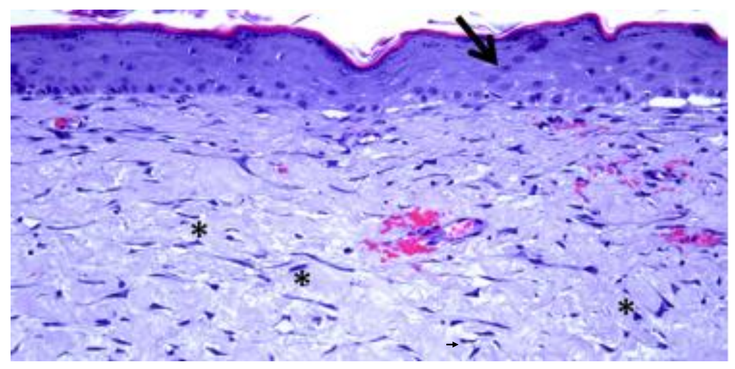


Figure 4. Histology of the autologous skin. → keratinocites *Fibroblasts.

SKIN EQUIVALENT IN HORSE

• Horse skin equivalent developed in a fibrine ECM (Cerrato et al. 2014).

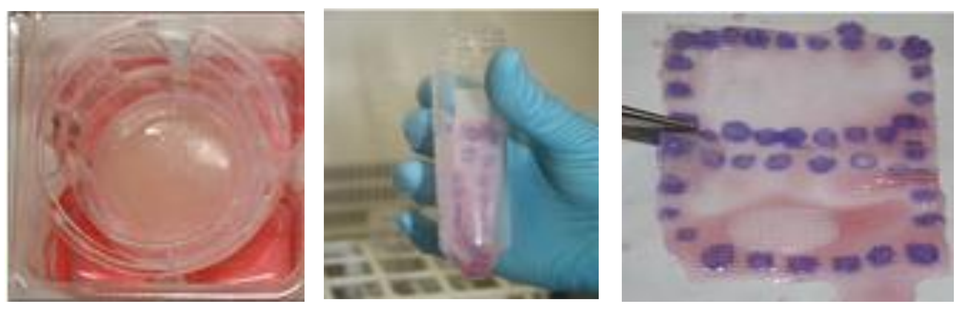


Figure 5. Equine skin equivalent obtention.

CONCLUSIONS

✓ The ECM have been developed in the last years from the decellularized tissues to 3D bioprinting matrix

✓ Different types of MEC are available depending of their origins, their structure and their physical chemistry properties.

✓ Some animals models have been helpful for human medicine. Moreover, skin transplants in dog and horse have also successfully been carried in vet medicine.

References

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